

These data can very easily be verified, and they are very instructive. Another question is, whether the "active albumen" is in any way connected with the "vital power" itself, and if we have here a reaction, from which we may judge whether life is present or not. The aldehyde theory, when employed here, can explain the vital power, but it seems a little incomprehensible that the vital power should merely be based upon chemical processes. Still, whether the theoretical deductions are provable or not, we have in Loew and Bokorny's investigations a very important contribution to cellular physiology.

In spite of the many efforts to the contrary, the door is being gradually opened to cellular and molecular physiology. Logical definitions and improved methods will be a mighty support. We have no doubt that the way to molecular physiology will be through the phenomena of the *cell-life* on one side and through the phenomena of *movement* on the other hand, and we shall see more and more clearly that "there is only one kind of life and one kind of physiology for all beings."—J. CHRISTIAN BAY.

Nutrition of insectivorous plants.

N. Tischutkin made a series of investigations on the activity of micro-organisms in the nutrition of insectivorous plants,¹⁴ which shows that in the secretion of insectivorous plants the proteid substances are altered through the influence of micro-organisms, especially bacteria; that such organisms are always living in the fluid excreted by fully developed insectivorous plants; that the process of digestion does not begin with the beginning of excretion of the digestive solution and does not occur until a sufficient number of micro-organisms are present; that the organisms effective here come from the air or from other sources; and lastly, that the part performed by the plant is only to furnish a substratum in which the micro-organisms may live. In the fluid of the secreting organs of *Pinguicula vulgaris*, *Drosera rotundifolia* and *longifolia*, *Dionaea muscipula*, and *Nepenthes Mastersi* several forms of bacteria were found, all being able to peptonize the albumen, and they were always living in the fluid. If these results prove to be correct, which is hardly to be anticipated, the theory of the digestive power of these plants together with

¹⁴Acta Horti Petropolitani XII, 1-19.

many biological explanations and theories will need alteration.
—J. CHRISTIAN BAY.

The phylogeny of ferns.

A late paper by J. Bretland Farmer will be found to contain suggestions of special importance to botanists interested in the phylogeny of the Filices.¹ Mr. Farmer finds that the divisions of the neck canal cell of the archegonium into two by a definite, transverse wall is by no means invariable. This has been observed by Dr. Douglas H. Campbell as an occasional occurrence in *Osmunda*, which this author has shown to be in many respects transitional between the eusporangiate and leptosporangiate Filicineae. The doubling of the nucleus in the canal cell in species of typical leptosporangiate Filicineae (Polypodiaceae) has been observed frequently. These facts suggest strongly the condition of things that obtains in the neck canal cell of the liverwort archegonium. The basal wall in the young embryo is formed as in *Isoetes* and *Equisetum*, at right angles to the long axis of the archegonium. The manner in which the young sporophyte issues from the oophyte distinguishes *Angiopteris* from those other ferns whose embryology is known. The cotyledon and stem burst through the upper surface of the prothallium, the root boring downwards through it, while in the other ferns the cotyledon and stem issue from the lower surface through the archegonial region, and grow up around the edge of the prothallium. The prothallium is very much like the thallus of *Anthoceros*, with which it is often associated.

These facts add more weight to the view that the eusporangiate ferns are the more primitive and that the ancestors of the Filices were closely connected with, if not derived from, the ancestors of such liverworts as *Anthoceros*.

It is to be regretted that Mr. Farmer's material was insufficient to make a thorough and critical study of that phase of the life history of the plant in question.—D. M. MOTTIER.

¹On the Embryogeny of *Angiopteris evecta* Hoffm.: *Annals of Botany* 12, 265 (October, 1892).